



Women Friendly Tools and Equipment Used in Rice Cultivation

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Agriculture has important place in Indian economy and main work force in it is human power. The women work force in agriculture and allied sectors is estimated to be around 91 million which amounts to about 39% of the total rural workers in the country. The tools/equipment available for different farming operation are earlier designed for men workers keeping in mind male dominance in Indian agriculture environment and same was given to women despite of their suitability to work. However women face different technological difficulties in operating these tools, thereby causing serious occupational health problems and ultimately reducing work efficiency.

Introduction

Paddy is the principal food crop in India and its production reached to a record high of 104.32 million tonnes in 2011-2012 crop years (July-June). Activity includes in paddy cultivation are sowing, transplanting, weeding, harvesting, threshing, and winnowing which are very drudgery causing. Women are actively involved in all these operation of rice cultivation but still they are using age old farm tools and equipment to carry out this activity. In paddy production system farm women have to bend over the work surface which is main cause of drudgery for operation such as for transplanting, weeding, harvesting and threshing. But its modernization is still remain and is practised by traditionally available age old farm tools. For example in villages seed sowing is done by hand, weeding by khurpi, harvesting by local (plain) sickle and grain cleaning by sieves and sup, etc. In operating these tools mainly bending posture is followed which causes drudgery and leads to serious health issue such as back pain, knee pain and sometime also causes injury to women operating it.

Therefore, there is need to develop tools/ equipment considering women suitability to work. Now a day's importance of women role in paddy cultivation is recognised and importance of technologies supporting women are designed and introduced. Women friendly tools developed for rice cultivation are paddy seeder, paddy transplanter, cono weeder, improved sickle, paddy thresher and winnower. These equipment are listed below along with their brief description and working.

The improved tools and equipment for rice cultivation:-

1. Paddy seeder (Four row)

Function: For line sowing of sprouted paddy seeds in puddled field.

Brief Description: It consists of drive wheels with lugs, drive shaft, hyperboloid shaped drums and swinging type pulling beam. The drum has 18 holes of 10 mm dia. each



Fig.1 Paddy Seeder (Four rows)

for dropping the sprouted seed in puddled field. Drum may be filled with pre-germinated/sprouted paddy seeds to half of its capacity. Then the lid of the drum may be closed and locked. The equipment is required to be operated at a walking speed of 1-1.5 km/h in the puddled field. During the operation of the equipment, dropping of seeds through the holes may be observed and drums may be refilled when the drum gets empty. The weight of equipment is about 8 kg and its cost is about Rs. 6,000/-.

Benefits over traditional method: Seed saving is achieved with this equipment as compared to traditional method. Also, line sowing is done with the equipment which promotes use of mechanical weeder thereby reducing drudgery and cost involved in weeding operation.

2. Paddy Transplanter (Two row)

Function: For transplanting of 20–25 days old mat type rice seedlings at 3-4 leaf stage in two rows simultaneously.

Brief Description: It consists of frame, floats, seedling tray, operating handle, fingers (pickers), tray drive unit and depth control mechanism. A mat type nursery of size 22 cm in width, 45 cm in length and thickness of soil of 1.5 cm is required to operate the equipment. After puddling excess water (leaving 25-50 mm of water) is drained and from next morning the equipment can be operated. For smooth sliding of mat little quantity of water is needed to be sprinkled on the machine tray before loading the mat on it. After lifting the operating handle, it may be pushed down gently to push the seedlings kept in tray for transplanting. A worker has to walk backward for operation of the rice transplanter and pulls it after every stroke. The seedlings mats may reloaded on the tray of equipment when seedlings are about to exhaust. After completion of each day of work, the transplanter may be washed with water. The weight of equipment is about 14 kg and its cost is about Rs. 6,000/-.



Fig. 2 Paddy Transplanter (Two rows)

Benefits over traditional method: There is 16% saving in cardiac cost of worker per unit area with paddy transplanter. So productivity of workers is increased by 79% compared to traditional way of transplanting. It also avoids bending posture which is usually adopted in traditional method.

3. Cono Weeder

Function: For Uprooting and burying of weeds in between standing rows of rice crop in wetlands.

Brief Description: Two truncated rollers one behind other are fitted at the bottom of a long T type handle. To prevent the unit from sinking into the soil a float is provided in front portion of unit. It disturbs the top soil and increases aeration also. The equipment is operated in standing posture thus avoiding bending posture involved in uprooting of weeds by hands in traditional practice. The cost of equipment is Rs. 1900/-.



Fig. 3 Cono Weeder

Benefits over traditional method: As the equipment is operated in standing posture, it avoid the bending posture as in case of traditional way of weeding thus drudgery of worker is reduces and ultimately output is also increased.

4. Improved Sickle

Function: For harvesting rice crops.

Brief Description: It consists of serrated blade, ferrule and wooden handle. With this sickle (serrated) cutting of crop stalk is being done by sawing action as against the impact or pulling action in case of local (plain) sickle. This improved sickle is light in weight i.e., 180 g as compared to local one having weight 350 g, thus reduces the drudgery during harvesting operation. Its cost is about Rs. 60/-

Benefits over traditional method: With the use of improved sickle there is about 15% saving in cardiac cost of workers per unit of output as compared to local sickle. It provides safety to the worker due to its better construction. Also, serrated sickle does not require sharpening of the cutting edge.



Fig. 4 Improved Sickle

5. Pedal operated Paddy Thresher

Function: For threshing of paddy.

Brief Description: It consists of a cylinder with aluminum strips. The wire loops are embedded / welded on these strips. The cylinder is given a rotary motion from the foot pedal through a power transmission system. The paddy bundles are threshed by holding it on rotating drum. It gives the output of about 35 kg/hr. The cost of equipment is Rs. 5,500/-.

Benefits over traditional method: It reduces the drudgery involved in paddy threshing operation as bending posture is avoided and arms are not to be raised above shoulder height as in case of traditional method i.e., beating on a platform/stone.



Fig. 5 Paddy Thresher

6. Paddy Winnower

Function: For cleaning grain from impurities after harvesting.

Brief Description: It consists of main frame, handle, gear mechanism, volute case, fan, hopper, outlets for clean grain and for chaff. This machine is operated by women worker in standing posture. Two women workers are required for operating machine, one woman operates the machine and other woman feeds the hopper and separates the cleaned grain. The machine can be easily operated by women while seating on chair or stool. Capacity of this machine is about 242 kg/hr. Cost of this equipment is Rs. 6000/-.

Benefits over traditional method: This machine can be easily operated as there is no need of waiting for air flow as in case of traditional method. This machine can be operated under shade so grain cannot get damaged due to rain etc.



Fig. 6 Paddy winnower

Conclusion

By using improved tools, drudgery can be reduced in almost at every stages of operation i.e., in sowing, transplanting, weeding, and threshing. The farm women can operate above mentioned equipment easily as they are basically developed for them, considering women anthropometric data and their capability. Also these equipments could be used on custom hiring for income generation apart from reducing drudgery. Thus, issues of drudgery and health problems can be addressed by using these improved tools and also there would be improvement in their livelihood.